**Habitat for Humanity White County Arkansas Affiliate**

**ENGR 330**

**Woodruff II House Plans**

**Mr. Rich Wells**

**Shawn Batten**

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**Abstract:**

This project goes through the process of designing a small Habitat for Humanity house. It starts with the goals, constraints and considerations for the house’s design. After that it goes to developing the concept house. Then reviewing and updating the concept until it is ready to be made into a dimensioned design. Next, creating the design for accurate dimensions, to be reviewed and revised again several times until a satisfactory design is achieved.

**Introduction:**

To come up with an effective set of house plans many things need to be considered. Some of these factors include cost, location, culture and future owner. Designing this house came with additional consideration given by Habitat for Humanity, such as a restriction on size as well as the goals that Habitat for Humanity sets, of simple, descent, and affordable housing for every home that they build.

**Objectives:**

The primary goal of this project is to design a house that accomplishes the goals of Habitat for Humanity as well as fit within the constraints given by the location, culture, and climate. The goals set by Habitat for Humanity are to make the house sustainable, energy efficient, safe and healthy. Furthermore, the house needs to fit well in the community; Habitat strives to make their builds a positive impact on the entire community. They also are very conscious to prevent the breeding resentment for the new Habitat owner, by building houses that are on the level as those around it.

**Requirement / Considerations:**

* Energy Efficiency
  + Window Location
  + House Profile
  + Exterior Wall Thickness
  + Location of HVAC to
* Sustainability
* Safe and Healthy
  + Safe Room
  + Ventilation
  + Doors/Windows
* Affordable
  + Minimize Plumbing
* Effective Use of Space
  + Minimize Walkways
  + Organization of the Kitchen
  + Size limited to 1050 ft2.

**Concepts/Designs:**

The original idea was to incorporate a safe room into the design of the house this imposed the criteria below

* Bathroom to be used for safe room cannot be on an exterior wall
* All walls must be detached from safe room
* All walls of the safe room must be 6 in. thick

Incorporating as many of the requirements and considerations previously stated the original house concept was developed it is shown below in Fig. 1.

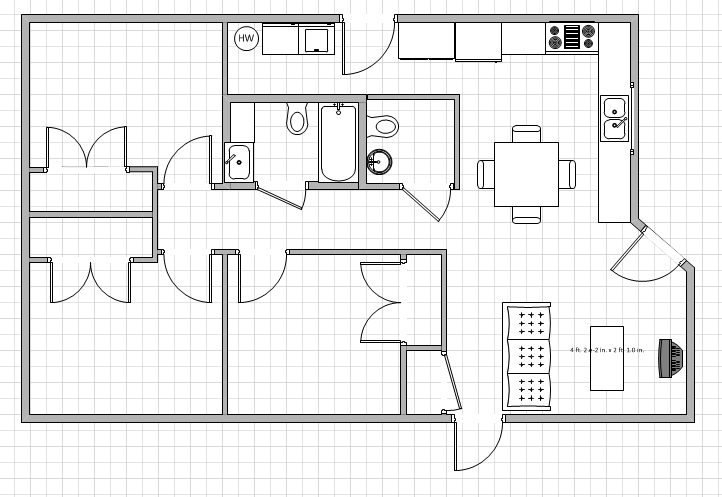
 Upon reviewing this concept the short comings were determined to be:

Fig. 1 House Design #1

* Small Kitchen size
* Small Living room
* Non-ideal HVAC location
* Excess exterior doors
* Excessive bedroom closet space

A few changes were made to this concept then they were drafted in ArchiCAD to produce, the first design shown below in Fig. 2.

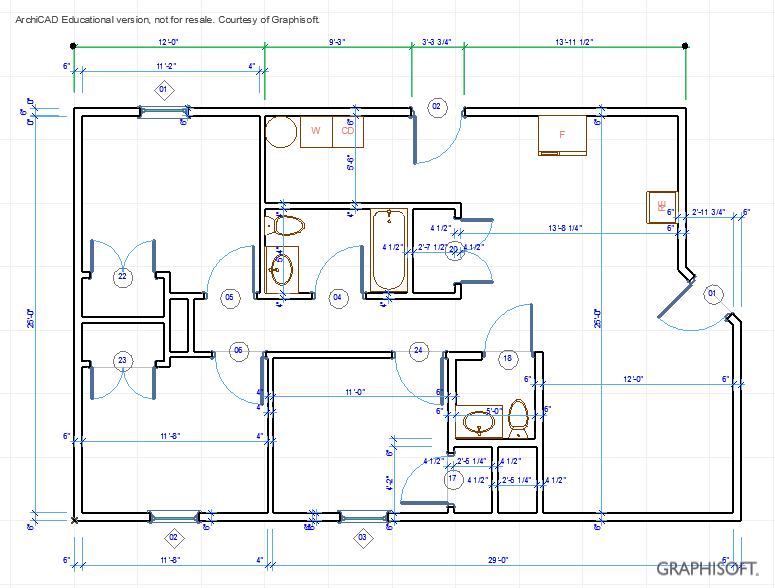


Fig. 2. House Design #2

The second house was then reviewed and determined to have these disadvantages:

* Small Living Room
* Excessive plumbing piping required
* Small Safe Room
* Difficulty with the Safe room connection
* Too much walkway space
* Poor Location for HVAC

After considering these downfalls changes were made to produce the second house design shown below in Fig. 3.

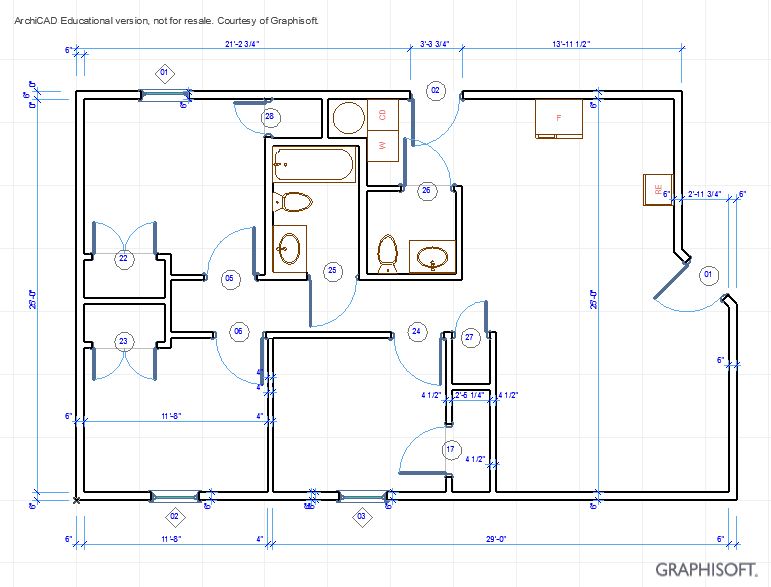


Fig. 3. House Design #3

This plan was given to habitat for humanity for review. Feedback received by them as to changes to the design of the house include:

* Incorporate only one bathroom
* Eliminate the safe room on this house
* Make all angles 90 degrees for ease in building the porch roof
* Create more storage space outside of the bedrooms

Working directly with Habitat for Humanity a third house design was drafted it can be seen below in Fig. 4.

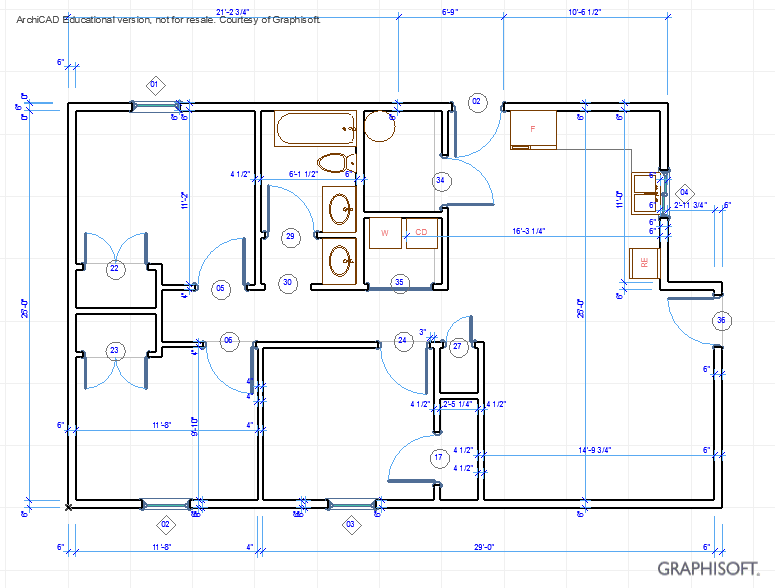


Fig. 4. House Design #4

The fourth design has many improvements over the other designs as well. Some of the benefits of this design include:

* Large storage room
* Moderately spacious area for the washer and dryer
* Spacious Kitchen and Living Room
* Well located HVAC
* Extra sink for use outside of the bathroom
* Limited plumbing piping required

On the other hand some of the deficits of this design are:

* Small area for the extra sink located in pathway to the bathroom
* Orientation of the bathroom uses up extra space required for door clearance

**Conclusion:**

Attempting to come up with a sufficient design of a small, energy efficient and economical house is a difficult challenge. To successfully come up with this design took a large amount of time, consideration, revisions and feedback. The final design should be a simple, descent and affordable house.